PURDUE INNOVATES | Office of Technology Commercialization

Tannic Acid-based Nanocapsules for Sustained Delivery of Immunogenic Cell Death Inducers

A nanoparticle drug delivery system enables sustained, low-dose chemotherapy while enhancing the anti-tumor immune response and increasing drug metabolic stability.

Researchers at Purdue University have developed a nanoparticle-based system for sustained release of chemotherapeutic drugs at low doses that leaves antitumor immune cells with full functionality. Chemotherapy has been a mainstay in cancer treatment because of the anti-proliferative effects it imposes on tumor cells. Several chemotherapeutic treatment options result in generation of cancer antigens that aid in the activation of the host's antitumor immune response. Paradoxically, these treatment options also damage immune cells, diminishing their antitumor effect. In response to this shortcoming of traditional chemotherapies, Purdue's researchers developed a system to deliver chemotherapeutics and keep immune cells healthy. Their nanoparticle delivery system also elicits an enhanced immunogenic response compared to other chemotherapeutic delivery options along with increasing the metabolic stability and tumor retention of chemotherapeutic drugs. The chemotherapeutic, carfilzomib, formulated with this delivery system showed consistently greater antitumor effects against two tumor types in a mouse model compared to the cyclodextrin-solubilized drug.

Advantages

-Sustained Release of Chemotherapeutic Drug

-Enhanced Immune Response

-Increased Drug Metabolic Stability

Potential Applications

-Chemotherapy

-Cancer Treatment

Technology ID
2020-YEO-68760

Category
Pharmaceuticals/Small Molecule Therapeutics
Pharmaceuticals/Drug Delivery & Formulations

Authors
Maie Taha
Yoon Yeo

Further information
Joe Kasper
JRKasper@prf.org

Nathan Smith
nesmith@prf.org

View online

Related Publication:

Sustained Delivery of Carfilzomib by Tannic Acid-Based Nanocapsules Helps Develop Antitumor Immunity

Nano Lett. 2019, 19, 11, 8333-8341

DOI: 10.1021/acs.nanolett.9b04147

Domain: Pharmaceuticals

TRL: 3

Intellectual Property:

Provisional-Patent, 2019-09-13, United States | PCT-Gov. Funding, 2020-09-11, WO | NATL-Patent, 2022-03-08, United States

Keywords: nanoparticle delivery system, sustained drug release, chemotherapeutic drugs, antitumor immunity, cancer immunotherapy, enhanced immune response, drug metabolic stability, carfilzomib delivery, tannic acid nanocapsules, cancer treatment